ACC.12
61st Annual Scientific Session & Expo
ACC-i2 with TCT innovation in intervention

E811
JACC March 27, 2012
Volume 59, Issue 13

Congenital Cardiology Solutions

COMPARISON OF BONE-MARROW DERIVED CD133+-CELLS AND CELLS OBTAINED FROM CAROTID ARTERY AFTER PERCUTANEOUS TISSUE ENGINEERED PULMONARY VALVED STENT IMPLANTATION

ACC Moderated Poster Contributions
McCormick Place South, Hall A
Sunday, March 25, 2012, 11:00 a.m.-Noon

Session Title: Congenital Cardiology Solutions: Interventional Solutions
Abstract Category: 27. Congenital Cardiology Solutions: Pediatric
Presentation Number: 1136-135

Authors: *Anja Metzner, Jessica Boldt, Judith Pohanke, Gunther Fischer, Jan Schoettler, Jochen Cremer, Georg Lutter, Department of Cardiovascular Surgery, University hospital Schleswig-Holstein, Campus Kiel, Kiel, Germany, Department of Pediatric Cardiology, University hospital Schleswig-Holstein, Campus Kiel, Kiel, Germany*

Background: Tissue engineering represents an enormous advantage for the treatment of Tetralogy of Fallot.

Methods: In this study we compared the use of endothelial cells (EC) and smooth muscle cells (SMC) derived from the carotid artery (group 1/ n=5) with CD133+-cells derived from bone-marrow (group 2/ n=5). Western blot analysis and histology were done before and after percutaneous implantation of the pulmonary valved stent. After seeding of the pulmonary valved stent with one of the cell groups, the construct was placed in a dynamic bioreactor for 16 days. The calcification can be classified in grade 0 (no calcification), grade 1 (micro-), grade 2 (mild-), grade 3 (moderate-) and grade 4 (strong calcification).

Results: Western blot analysis demonstrated a mixture of SMCs and ECs in group 1, while in group 2 only CD133+-cells were detected. Three months after implantation, CD31-staining demonstrated a typical cobblestone-like morphology in both groups. Immuno[[Unsupported Character - Codename]]histochemistry revealed strong expression of α-smooth muscle actin and in-growth into the leaflets in the two groups. CD3-, CD20-, CD45- and CD68-staining confirmed no signs of inflammation in all analyzed animals in group 2, in group 1 small amounts of inflammation were detected. Von Kossa staining revealed only mild to moderate calcification in the annular region of group 1. In contrast, no calcification was detected in group 2.

Conclusions: This study demonstrates that autologous CD133+-cells derived from bone-marrow had a better outcome with regard to calcification and inflammation compared to the cells derived from carotid artery.